National Grid SA-COA

PRODUCTION FILE

Contractor : ABB Contracting Co.

Project : SS 8709- 132/13.8kV in Alkharj City

Contract No : 11131113/00

Substation : 8709

Subject : 132kV Busbar Protection Set-2 (+BBP2-6) Relay Panel -6

ABB

POWER SYSTEMS NETWORK MANAGEMENT
PROTECTION AND SUBSTATION AUTOMATION SYSTEMS
WBS NO: S-13656

ABB AUTOMATION COMPANY LTD.
414, AL-KHARJ ROAD
SECOND INDUSTRIAL CITY
RIYADH-11383 K.S.A

CLIENT : SAUDI ELECTRICITY COMPANY CENTRAL OPERATING AREA

CONTRACTOR : ABB Contracting Co

PROJECT : CONSTRUCTION OF NEW 132/13.8kV SS 8709 IN AL-KHARJ CITY

SUBSTATION : S/S 8709

CONTRACT NO. : 11131113/00

TITLE : Assembly Drawing - +BBP2-6
[132KV BUSBAR PROTECTION MAIN-2 BAY UNIT PANEL]

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 14	FOR APPROVAL

AS-BUILT BY _____ DATE _____ CONTRACT NO. 11131113/00 JOB ORDER NO. S-13656

DRAWN BY RIZ CHECKED BY KVR
DATE STARTED 11.04.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

COVER SHEET
132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-6
S/S 8709 S-13656
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
نقل الكهرباء National Grid SA

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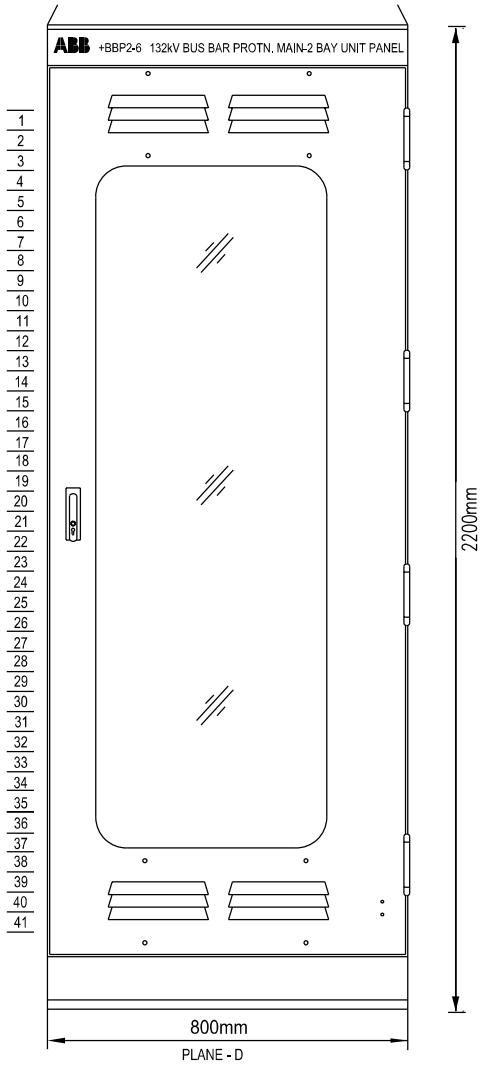

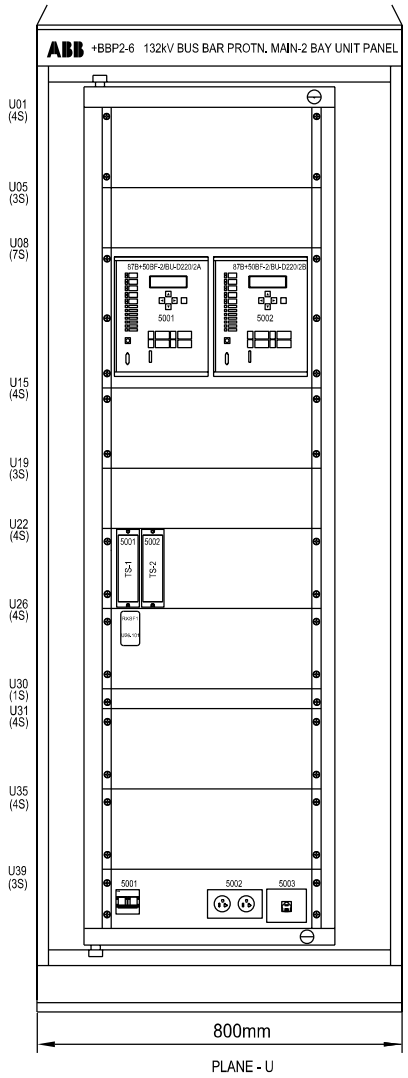

MOUNTING PLANES	
EXTERIOR COLOUR	AIRCRAFT GREY COLOUR TO SHADE NO. RAL7038
INTERIOR COLOUR	SIGNAL WHITE COLOUR TO SHADE NO. RAL9003
CUBICLE TYPE	VSH 200
FRAME	HINGED FRAME, MOVABLE
CUBICLE TYPE	FRONT ACCESS
MATERIAL OF CONSTRUCTION	ALUZINK STEEL
DIMENSIONS	2200 X 800 X 800 mm (H X W X D)
CLASS OF PROTECTION	IP 41
APPROX WEIGHT	200KG
CABLE ENTRY	BOTTOM

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ASSEMBLY DRAWING
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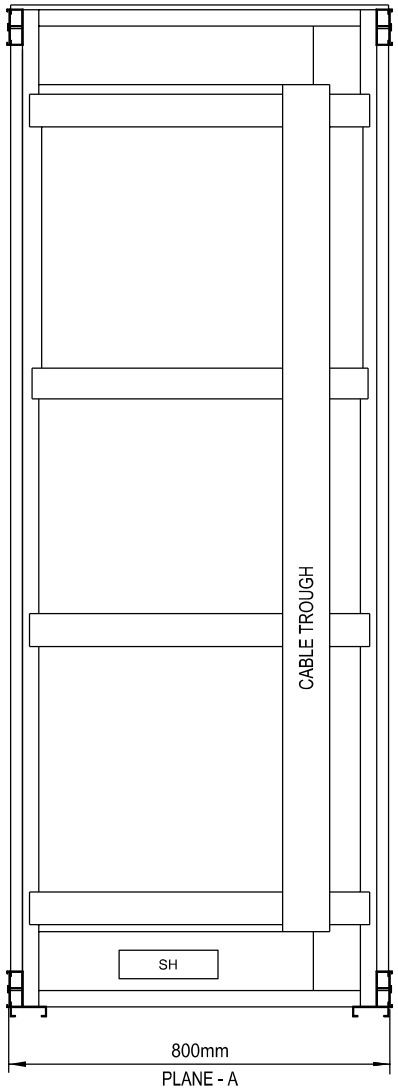

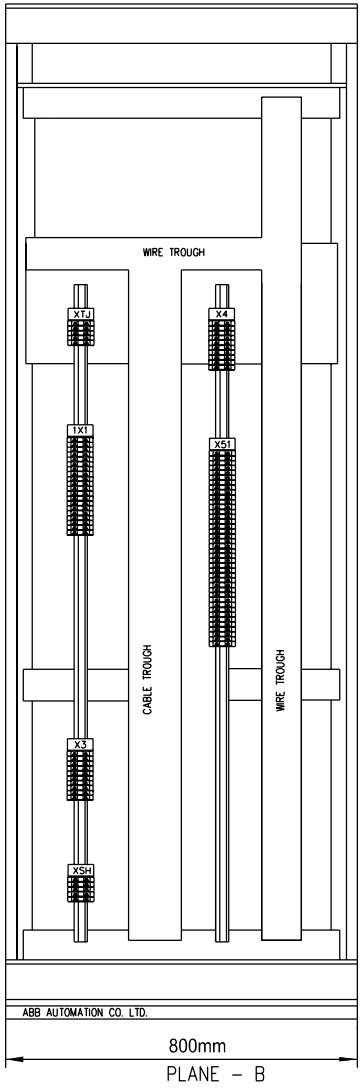

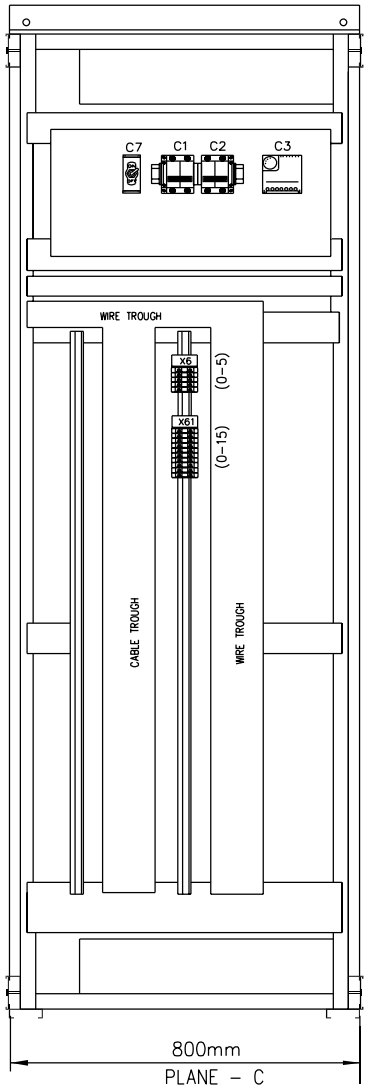

SCH.REF	DESCRIPTION	TYPE	MAKE
X1	CT CIRCUITS	OTTA 6T P/P	PHOENIX
X3	AC CIRCUITS	D6/8.ST1.RS	ENTRELEC
X4	DC CIRCUITS	D6/8.ST1.RS	ENTRELEC
X51	DC PROTN.CIRCUITS	M6/8.RS	ENTRELEC
X6	ALARM SUPPLY	M6/8.RS	ENTRELEC
X61	COM ALARM CIRCUITS	M6/8.SNB	ENTRELEC
XTJ	TELEPHONE JACK	M6/8.RS	ENTRELEC
XSH	SPACE HEATER	M6/8.RS	ENTRELEC

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ASSEMBLY DRAWING
132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-6
S/S 8709 S-13656
RIYADH SAUDI ARABIA

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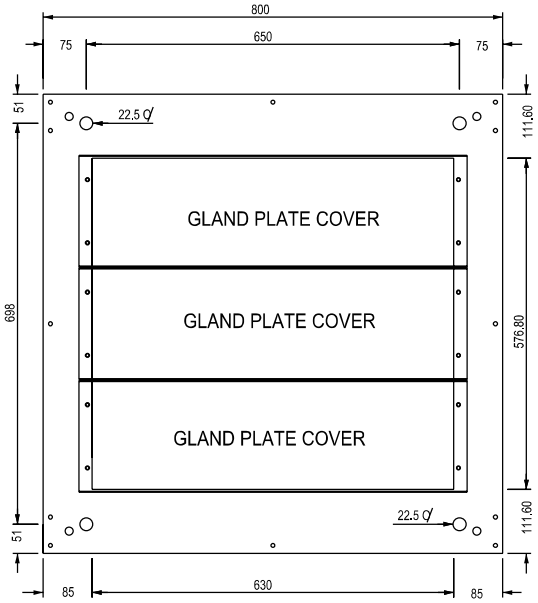
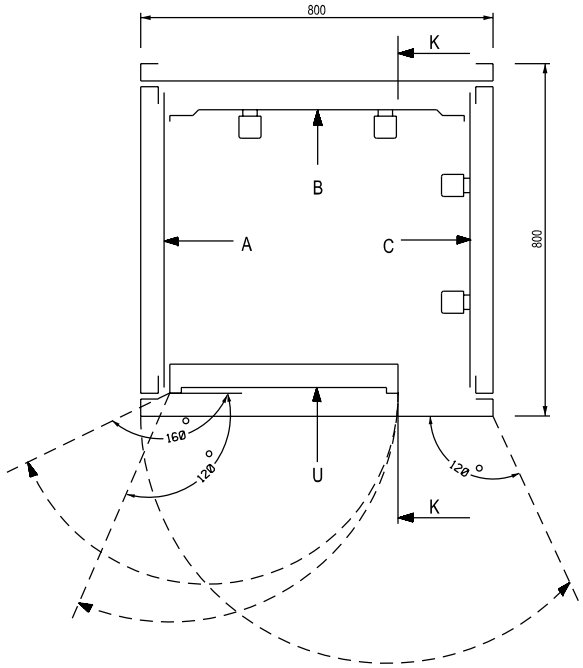
BASE PLATE/
FOUNDATION



PLAN



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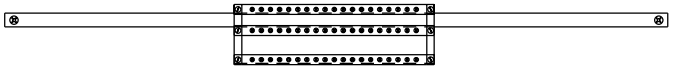
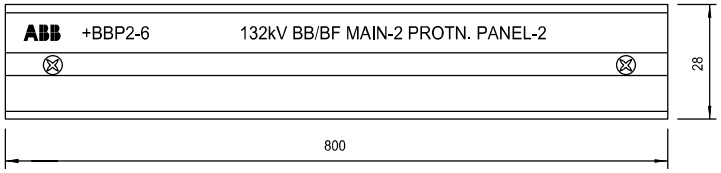
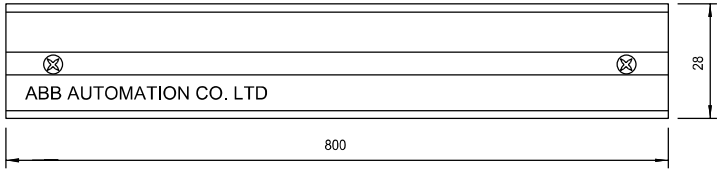


TOP VIEW FOR EARTHING BAR

U PLANE TOP LABEL



U PLANE BOTTOM LABEL



MANUFACTURING LABEL

ABB ABB Automation Co.Ltd.

PROJECT	:	National Grid SA	S/S 8709
ORDER REFERENCE	:	2875 RF S13656	
YEAR OF MANUFACTURE	:	2013	
PANEL NO.	:	BBP2-6	
DRAWING NO.	:	S13656-CD-323016	

MADE IN THE KINGDOM OF SAUDI ARABIA

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ASSEMBLY DRAWING

132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-6

S/S 8709 S-13656

RIYADH SAUDI ARABIA

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POWER SYSTEMS NETWORK MANAGEMENT
PROTECTION AND SUBSTATION AUTOMATION SYSTEMS
WBS NO: S-13656

ABB AUTOMATION COMPANY LTD.
414, AL-KHARJ ROAD
SECOND INDUSTRIAL CITY
RIYADH-11383 K.S.A

CLIENT : SAUDI ELECTRICITY COMPANY CENTRAL OPERATING AREA

CONTRACTOR : ABB Contracting Co

PROJECT : CONSTRUCTION OF NEW 132/13.8kV SS 8709 IN AL-KHARJ CITY

SUBSTATION : S/S 8709

CONTRACT NO. : 11131113/00

TITLE : LIST OF APPARATUS - +BBP2-6
[132KV BUSBAR PROTECTION MAIN-2 BAY UNIT PANEL]

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DMS VECTOR NGD200

SR. NO.	GA. REF.	SCH. REF.	DESCRIPTION	SHT.	QTY.	TYPE	MAKE	ORDERING INFORMATION
			RELAY CUBICLE- +BBP2-6 FOR 132KV BB/BF MAIN-2 ACCOMODATING THE FOLLOWING		2	VSH 200	ABB	
1	U08.5001	87B+50BF-2/BU-D220/2A	BAY UNIT FOR NUMERICAL BUSBAR PROTECTION WITH FOLLOWING	293,294		7SS523	SIEMENS	7SS5231-5CA01-1AA1/GG
	U08.5002	87B+50BF-2/BU-D220/2B	HIGH TROUGH-FAULT STABILITY EVEN IN CASE OF CT SATURATION.	295,296				
			NEUTRAL CURRENT CRITERION INSTANTANEOUS VALUES FOR FAULT RECORDING.					
			DISTURBANCE FREE AND FAST DATA TRANSFER TO & FROM CENTRAL UNIT					
			PHASE SEGRAGATED MEASUREMENT					
			REDUCE CT PERFORMANCE REQUIREMENTS					
			BUILT IN HUMAN MACHINE INTERFACE					
			BUILT IN BREAKER FAILURE FUNCTION.					
			END FAULT PROTECTION FUNCTION					
			DISTURBANCE RECORDER					
			BINARY OUTPUT : 20					
			BINARY OUTPUT : 6+2-WD					
			FULLY NUMERICAL SIGNAL PROCESSING					
			RATED CURRENT : 1A					
			AUX. VOLTAGE : 60-250V DC					
			RATED FREQUENCY : 60HZ					
2	U22.101	TS-1	TEST SWITCH FOR 87B+50BF-2/BU-D220/2A RELAY	293	2	MMLG02	ALSTOM	MMLG02 R1AA 0001D
	U22.102	TS-2	TEST SWITCH FOR 87B+50BF-2/BU-D220/2B RELAY	295				
3	U26.101	74BF-2/BU-D220	DUAL TARGET RELAY FOR 87B+50BF-2/D220	235	1	RXSF 1	ABB	RK 271 019-AN
			AUXILIARY VOLTAGE : 110-125V DC					
			CONTACT DATA : 1NO + 2NC					
			FLAG : SELF RESET,REVERSE					

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LIST OF APPARATUS
132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-6
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SR. NO.	GA. REF.	SCH. REF.	DESCRIPTION	SHT.	QTY.	TYPE	MAKE	ORDERING INFORMATION
4			MCB 2 POLE 6A, FOR DC SUPPLY	216	2	S2-H02	ABB	GH2820164R0377
			WITH 2NC AUXILIARY CONTACT					S2C-H11L- 2CDS 200936 R0001
	U39.5001	Q1	D220 ± BF2 SUPPLY					
5		C1,C2	MINIATURE CIRCUIT BREAKER, 2 POLE, 10A FOR	211	2	S202-C10	ABB	2CDS 252 001 R0104
			CONVENIENCE OUTLET WITH AUXILIARY SWITCH, 1NO + 1NC CONTACTS			+S2-H02		
6	U39.5002	C01	CONVENIENCE OUTLET 10A, 127V AC	211	2	USM45 & USMS45	LEGRAND	74140 & 74180
		C02	CONVENIENCE OUTLET 10A, 220V AC					
7		C3	THERMOSTAT FOR SPACE HEATER, 5-60°C	211	1	SK 3110	RITTAL	SK 3110
8	U39.5003	TJ	TELEPHONE JACK 1GANG 4WIRE	211	1	EDF410	EDISON	EDF410
9		C7	ON/OFF SWITCH FOR SPACE HEATER	211	1	M2SS1-10B	ABB	1SFA 611 200 R1006
						MCBH-10		1SFA 611 605 R1101
10		DS	DOOR SWITCH FOR CONTROL OF CUBICLE INTERNAL ILLUMINATION LAMP	211	1	LS30P	ABB	1SBV 010213 R1202
11		IL	INTERNAL ILLUMINATION CUBICLE LAMP SUITABLE FOR	211	1	T-4	SUNON	SP-20W
			127V AC, 60Hz SUPPLY, 20W					
12		SH	SPACE HEATER, 55W, 127V, 60Hz	211	1	IFZEK7580104	COMPOTECH	-

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SR. NO.	ITEM DESIGNATION	D E S C R I P T I O N	SHEET.NO.	QTY.	TYPE	MAKE	ORDERING INFORMATION
13	1X1	BOLT CONNECTING TERMINAL BLOCKS FOR DISCONNECTABLE CT CIRCUITS	301	20	OTTA 6T P/P	PHOENIX	0790462
	X3	SPRING LOADED TERMINAL BLOCKS FOR DISCONNECTABLE AC CIRCUITS		10	D6/8.ST1.RS	ENTRELEC	1SNA 115 831 R0400
	X4	SPRING LOADED TERMINAL BLOCK FOR DISCONNECTABLE DC EXT. CIRCUITS		10	D6/8.ST1.RS	ENTRELEC	1SNA 115 831 R0400
	X51	SPRING LOADED TERMINAL BLOCK FOR DC PROTN. CIRCUITS-BU-D220		50	M6/8.RS	ENTRELEC	1SNA 115 688 R2500
	X6	SPRING LOADED TERMINAL BLOCK FOR ALARM CIRCUITS		5	M6/8.RS	ENTRELEC	1SNA 115 688 R2500
	X61	KNIFE TYPE TERMINAL BLOCKS FOR COMMON ALARM CIRCUITS		10	M6/8.SNB	ENTRELEC	1SNA 115 685 R1200
	XTJ	SPRING LOADED TERMINAL BLOCKS FOR TELEPHONE JACK		5	M6/8.RS	ENTRELEC	1SNA 115 688 R2500
	XSH	SPRING LOADED TERMINAL BLOCKS FOR SPACE HEATER		3	M6/8.RS	ENTRELEC	1SNA 115 688 R2500

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LABEL REF.	LABEL ENGRAVING	MATERIALS	ENGRAVING	LABEL SIZE	LETTER SIZE
U08.5001	U08.5001 87B+50BF-2/BU-D220/2A	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U08.5002	U08.5002 87B+50BF-2/BU-D220/2B	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U22.5001	U22.5001 TS-1	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U22.5002	U22.5002 TS-2	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U26.101	U26.101 74BF-2/D220	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U39.5001	U39.5001 DC SUPPLY MCB FOR D220	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U39.5002	U39.5002 C01-127V,C02-220V	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U39.5003	U39.5003 TJ	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm

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LABEL REF.	LABEL ENGRAVING	MATERIALS	ENGRAVING	LABEL SIZE	LETTER SIZE
C1	C1 127V AC SUPPLY MCB	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
C2	C2 220V AC SUPPLY MCB	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
C3	C3 THERMOSTAT	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
C7	C7 ON/OFF SWITCH	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
DS	DS DOOR SWITCH	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
IL	IL ILLUMINATION LAMP	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
SH	SH SPACE HEATER	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm

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LIST OF APPARATUS
132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-6
S/S 8709 S-13656
RIYADH SAUDI ARABIA

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POWER SYSTEMS NETWORK MANAGEMENT
PROTECTION AND SUBSTATION AUTOMATION SYSTEMS
WBS NO: S-13656

ABB AUTOMATION COMPANY LTD.
414, AL-KHARJ ROAD
SECOND INDUSTRIAL CITY
RIYADH-11383 K.S.A

CLIENT : SAUDI ELECTRICITY COMPANY CENTRAL OPERATING AREA

CONTRACTOR : ABB Contracting Co

PROJECT : CONSTRUCTION OF NEW 132/13.8kV SS 8709 IN AL-KHARJ CITY

SUBSTATION : S/S 8709

CONTRACT NO. : 11131113/00

TITLE : SCHEMATICS DRAWINGS - +BBP2-6
[132KV BUSBAR PROTECTION MAIN-2 BAY UNIT PANEL]

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OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

COVER SHEET
132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-6
S/S 8709 S-13656
RIYADH SAUDI ARABIA

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CONTENTS	ABB SHT.NO.	REV.00	REV.01	REV.02
COVER SHEET	000	X	X	
CONTENTS SHEET	001	X	X	
GRAPHICAL SYMBOLS FOR DIAGRAMS	011	X	X	
GRAPHICAL SYMBOLS FOR DIAGRAMS	012	X	X	
COMMON LEGEND	013	X	X	
FERRULE AND WIRING DETAILS	014	X	X	
DRAWING REFERENCES	015	X	X	
DRAWING REFERENCES	016	X	X	
PRIMARY SYSTEM	051	X	X	
AC SUPPLY FOR ILLUMINATION & POWER SOCKET	211	X	X	
CUB. LIGHTING, HEATER & SOCKET ALARM CKT.	212	X	X	
DC SUPPLY DISTRIBUTION	216	X	X	
CURRENT TRANSFORMER INPUTS -87B+50BF-2/BU-D220/2A	221	X	X	
CURRENT TRANSFORMER INPUTS -87B+50BF-2/BU-D220/2B	222	X	X	
87B+50BF-2/BU-D220/2A PROTN.RELAY-BINARY INPUTS	231	X	X	
87B+50BF-2/BU-D220/2A PROTN.RELAY-BINARY INPUTS	232	X	X	
87B+50BF-2/BU-D220/2B PROTN.RELAY-BINARY INPUTS	234	X	X	
87B+50BF-2/BU-D220/2B PROTN.RELAY-BINARY INPUTS	235	X	X	
COMMON ALARM CIRCUITS	292	X	X	
BLOCK REFERENCE 87B+50BF-2/BU-D220/2A	293	X	X	
BLOCK REFERENCE 87B+50BF-2/BU-D220/2A	294	X	X	
BLOCK REFERENCE 87B+50BF-2/BU-D220/2B	295	X	X	
BLOCK REFERENCE 87B+50BF-2/BU-D220/2B	296	X	X	
TERMINAL BLOCKS REFERENCE	301	X	X	

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CONTENTS SHEET
132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-6
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SYMBOL	DESCRIPTION
	FRAME CONNECTION
	EARTH CONNECTION
	RESISTOR
	VARIABLE RESISTOR
	RESISTOR WITH PRESET ADJUSTMENT
	CAPACITOR
	SEMICONDUCTOR DIODE USED AS A CAPACITIVE DEVICE
	OPEN CONTACT, MAKE CONTACT
	CLOSED CONTACT, BREAK CONTACT
	CHANGE-OVER CONTACT, BREAK BEFORE MAKE
	MAKE CONTACT WHICH IS EARLY WHEN OPERATING AND LATE WHEN RELEASING
	BREAK CONTACT WHICH IS LATE WHEN OPERATING AND EARLY WHEN RELEASING
	SWITCHING DEVICE WITH MANUAL CONTROL
	MAKE CONTACT DELAYED WHEN OPERATING
	BREAK CONTACT DELAYED WHEN RELEASING
	MAKE CONTACT DELAYED WHEN OPERATING AND RELEASING
	MAIN CONTACT OF A SWITCH DISCONNECTOR
	MAIN CONTACT OF A DISCONNECTOR

SYMBOL	DESCRIPTION
	MAIN CONTACT OF A CIRCUIT BREAKER
	PASSING MAKE CONTACT CLOSING MOMENTARILY DURING OPERATION AND RELEASE
	BREAK CONTACT DELAYED WHEN OPERATING
	MAKE CONTACT DELAYED WHEN RELEASING
	TWO MECHANICAL LINKS CROSSING WITHOUT CONNECTION
	JUNCTION OF MECHANICAL LINKS
	AUTOMATIC RESET
	NON-AUTOMATIC RESET
	SWITCHING DEVICE WITH MANUAL OPERATION AND WITH AUTOMATIC RESET
	SWITCHING DEVICE WITH MANUAL OPERATION AND WITH NON-AUTOMATIC RESET
	CHANGE-OVER SWITCHING DEVICE WITH MANUAL CONTROL AUTOMATIC RESET FROM POSITION 1-2 TO THE NEUTRAL POSITION
	RELAY WITH MAKE CONTACT
	RELAY WITH CHANGE-OVER CONTACT
	RELAY WITH MAKE CONTACT, DELAYED WHEN OPERATING
	RELAY WITH MAKE CONTACT, DELAYED WHEN RELEASING
	RELAY WITH MAKE CONTACT, DELAYED WHEN OPERATING AND RELEASING

SYMBOL	DESCRIPTION
	RELAY WITH TWO MAKE CONTACTS, ONE OF THEM DELAYED WHEN OPERATING
	RELAY WITH TWO ACTUATORS AND A TWO STABLE POSITIONS
	SIGNALLING LAMP
	MECHANICAL INDICATOR WITH AUTOMATIC RESET
	MECHANICAL INDICATOR WITH NON-AUTOMATIC RESET
	ELECTRICALLY CONTROLLED MECHANICAL INDICATOR WITH AUTOMATIC RESET
	ELECTRICALLY CONTROLLED MECHANICAL INDICATOR WITH NON-AUTOMATIC RESET
	RELAY WITH MECHANICAL INDICATOR
	ELECTRO-MECHANICAL POSITION INDICATOR WITH ONE DE-ENERGIZED AND ONE OPERATED POSITION
	ELECTRO-MECHANICAL POSITION INDICATOR WITH ONE DE-ENERGIZED AND TWO OPERATED POSITION
	BELL, BUZZER
	SIREN , HORN

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GRAPHICAL SYMBOLS FOR DIAGRAMS
132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-6
S/S 8709 S-13656
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SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	FUSE / LINK	W	WATTMETER		ELEMENT WITH NEGATED INHIBITING INPUT
	FUSE WITH THE SUPPLY SIDE INDICATED	Var	VARMETER		ELEMENT WITH INPUT WHICH DOES NOT CARRY ANY LOGIC INFORMATION
	SINGLE-PHASE TRANSFORMER WITH TWO SEPARATE WINDINGS (TWO ALTERNATIVE FORMS)	PF	POWER FACTOR METER	X|	ELEMENT WITH POSTPONED OUTPUT
	SINGLE-PHASE TRANSFORMER WITH THREE SEPARATE WINDINGS (TWO ALTERNATIVE FORMS)		POSITION INDICATOR	&	AND-ELEMENT WITH TWO INPUTS
	SINGLE-PHASE TRANSFORMER WITH FERRO MAGNETIC CORE		SYNCHROSCOPE	>1	OR-ELEMENT WITH TWO INPUTS
	SINGLE-PHASE VOLTAGE TRANSFORMER (MULTI-LINE AND SINGLE-LINE REPRESENTATION)	V	RECORDING VOLTMETER	≥2	LOGIC THRESHOLD ELEMENT WITH FOUR INPUTS AND THRESHOLD VALUE 2
	SINGLE-PHASE VOLTAGE TRANSFORMER WITH TWO SECONDARY WINDINGS (MULTI-LINE AND SINGLE-LINE REPRESENTATION)	W	RECORDING WATTMETER	=2	ELEMENT WITH THREE INPUTS FOR "2 AND ONLY 2"
	CURRENT TRANSFORMER (MULTI-LINE AND SINGLE-LINE REPRESENTATION)	h	HOUR METER	=1	EXCLUSIVE OR-ELEMENT WITH THREE INPUTS
	CURRENT TRANSFORMER WITH TWO CORES (MULIT-LINE AND SINGLE-LINE REPRESENTATION)	Wh	WATT-HOUR METER	=	LOGIC IDENTITY ELEMENT WITH THREE INPUTS
	CURRENT TRANSFORMER WITH TWO SECONDARY WINDINGS ON ONE CORE (MULTI-LINE AND SINGLE-LINE REPRESENTATION)	Wh	WATT-HOUR METER FOR ENERGY FROM A BUSBAR SYSTEM	>n/2	MAJORITY ELEMENT WITH THREE INPUTS
~	FILTER		ELEMENT WITH STATIC INPUT	1	NEGATOR
	HIGH-PASS FILTER		ELEMENT WITH STATIC NEGATED INPUT	&	NAND ELEMENT WITH TWO INPUTS
	BAND-PASS FILTER		ELEMENT WITH STATIC NEGATED OUTPUT	>1	NOR ELEMENT WITH TWO INPUTS
V	VOLTMETER	>	ELEMENT WITH DYNAMIC INPUT	X Y	BISTABLE ELEMENT
A	AMMETER	>	ELEMENT WITH DYNAMIC NEGATED INPUT		
			ELEMENT WITH INHIBITING INPUT		

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GRAPHICAL SYMBOLS FOR DIAGRAMS
132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-6
S/S 8709 S-13656
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LEGENDS

±R1	DC SUPPLY – MAIN PROTECTION
±R2	DC SUPPLY – SECONDARY PROTECTION
±R3	DC SUPPLY – BACK UP PROTECTION
±IT	DC SUPPLY – INTER TRIP
FL	DC SUPPLY – FLASHING CIRCUIT
BB RS±	DC SUPPLY – BUS BAR – PROTECTION RESET
BB CBF±/CBF±	DC SUPPLY – CBF PROTECTION
R	RESET BUS – ALARM SYSTEM
CR	CONTROL ROOM
ECC	ENERGY CONTROL CENTRE
LOCAL	THE LOCATION OF CONTROLLED DEVICE
REMOTE	ANY OTHER LOCATION NOT LOCAL
ON	CB NORMALLY OPEN AUXILIARY CONTACT
OFF	CB NORMALLY CLOSED AUXILIARY CONTACT
A	COMMON
T	TEST POSITION
S	SERVICE POSITION
CS	CLOSE IN SERVICE POSITION
CT	CLOSE IN TEST POSITION
LS	LOCAL SERVICE
LT	LOCAL TEST
LC	LOCAL CLOSE
LO	LOCAL OPEN
RO	REMOTE OPEN
OP	OPERATE
RE	RESET

NOTES

LABELS

WHITE LABEL WITH BLACK LETTERING WILL BE PROVIDED FOR ALL MOUNTED APPARATUS EQUIPMENT IDENTIFICATION AND FUNCTION REFERENCE LABEL WILL BE PROVIDED FOR FRONT MOUNTED EQUIPMENTS OF THE PANEL AND EQUIPMENT IDENTIFICATION LABEL WILL BE PROVIDED FOR INTERNALLY MOUNTED EQUIPMENTS

WIRING

PVC INSULATED 600V GRADE
2.5 SQ.mm. YELLOW COLOURED FOR CT CIRCUITS
2.5 SQ.mm. RE COLOURED FOR VT CIRCUITS
1.5 SQ.mm. GREY COLOURED FOR DC SUPPLY, SCADA AND CONTROL CIRCUITS
2.5 SQ.mm. BLACK COLOURED FOR AVC AND AC CIRCUITS
2.5 SQ.mm. YELLOW/GREEN COLOURED FOR EARTHING CONNECTIONS
FOLLOWING MARKERS SHALL BE PROVIDED ON FOLLOWING WIRES:
+ SIGN FOR DC + WIRE
– SIGN FOR DC – WIRE

LUGS

A. CT CIRCUITS– RING TYPE
B. OTHER CIRCUITS – SPADE TYPE

FERULLING

YELLO TUBE 3.2 mm FOR 1.5SQ mm WIRES AND 4.2 FOR 2.5 SQ mm WIRES
(AS PER 31 – TMSS–1, RE.0)

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COMMON LEGEND
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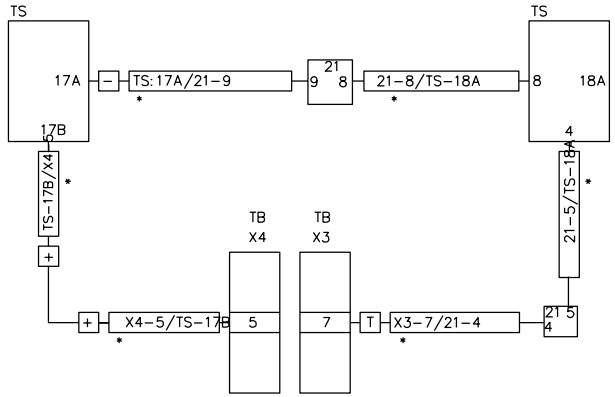
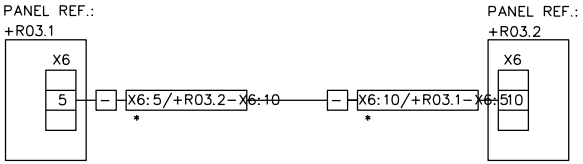
FOR 132kV RELAY & CONTROL, PROTN. PANELS



AS PER IEC-391 FIG 14a (W/O SUPPLEMENTARY/IDENTIFICATION MARK)

FOR 132kV PANELS INTERPANEL WIRING



AS PER IEC-391 FIG 14d (W/O SUPPLEMENTARY/IDENTIFICATION MARK)

WIRES – PVC insulated,stranded, coaled annealed copper conductor graded for 1000V	a. CT Circuits – 2.5 Sqmm PVC Yellow colour
	b. VT Circuits – 1.5 Sqmm PVC Red colour
	c. DC, & CONTROL Circuits – 1.5 Sqmm PVC Grey colour
	d. Alarm Circuits – 1.0 Sqmm PVC Blue colour
	e. AVC & AC Circuits – 2.5 Sqmm PVC Black colour
	f. Earth Circuits – 2.5 Sqmm PVC Yellow/Green colour
LUGS – Pre-Insulated	a(CT Circuits – Ring type
	b(Other Circuits – Spade type

NOTE: 1 ADDITIONAL MARKING AS APPLICABLE

NOTE: 2 FERRULE NUMBERING WILL BE BLACK LETTERS ON YELLOW TUBE
3.2 mm for 1.5 sq mm wires and
4.2 mm for 2.5 sq mm wires
(As per 31-TMSS-1, REV 0)

NOTE: 3 STARTING POINT OF THE FERRULE LEFT TO RIGHT

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FERRULE AND WIRING DETAILS
132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-6
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MANUFACTURER	SCHEMATICS DWG.NO	PANEL DESCRIPITION	PANEL REFERENCE
ABB PROTECTION & SUBSTATION AUTOMATION		SS 8709 132kV RELAY PANELS	
	CD-322928	132/13.8kV GT-1 RELAY PANEL -1	+R05.1
		132/13.8kV GT-1 RELAY PANEL -2	+R05.2
	CD-322931	132/13.8kV GT-2 RELAY PANEL -1	+R01.1
		132/13.8kV GT-2 RELAY PANEL -2	+R01.2
	CD-322934	132/13.8kV GT-3 RELAY PANEL -1	+R04.1
		132/13.8kV GT-3 RELAY PANEL -2	+R04.2
	CD-322936	132/13.8kV TRANSFORMER-1,2& 3 AVC PANEL	+AVC
	CD-322922	132KV SPARE-1 UGF RELAY PANEL -1	+R07.1
		132KV SPARE-1 UGF RELAY PANEL -2	+R07.2
	CD-322916	132KV 8020 UGF RELAY PANEL -1	+R02.1
		132KV 8020 UGF RELAY PANEL -2	+R02.2
	CD-322919	132KV 8710 UGF RELAY PANEL -1	+R03.1
		132KV 8710 UGF RELAY PANEL -2	+R03.2
	CD-322925	132KV SPARE-2 UGF RELAY PANEL -1	+R06.1
		132KV SPARE-2 UGF RELAY PANEL -2	+R06.2
	CD-323012	132KV FOIP PANEL	+FOIP
	CD-322946	132kV BUS COUPLER-A	+R130
	CD-322948	132kV BUS COUPLER-B	+R230
	CD-322950	132kV BUS SECTION	+R120
	CD-322991	132kV BUSBAR PROTECTION MAIN-1 CENTRAL UNIT PANEL	+BBP1-1
	CD-322993	132kV BUSBAR PROTECTION MAIN-1 BAY UNIT PANEL	+BBP1-2
	CD-322995	132kV BUSBAR PROTECTION MAIN-1 BAY UNIT PANEL	+BBP1-3
	CD-322997	132kV BUSBAR PROTECTION MAIN-1 BAY UNIT PANEL	+BBP1-4
	CD-322999	132kV BUSBAR PROTECTION MAIN-1 BAY UNIT PANEL	+BBP1-5
	CD-323001	132kV BUSBAR PROTECTION MAIN-2 CENTRAL UNIT PANEL	+BBP2-1
	CD-323003	132kV BUSBAR PROTECTION MAIN-2 BAY UNIT PANEL	+BBP2-5
	CD-323005	132kV BUSBAR PROTECTION MAIN-2 BAY UNIT PANEL	+BBP2-3
	CD-323007	132kV BUSBAR PROTECTION MAIN-2 BAY UNIT PANEL	+BBP2-4
	CD-323009	132kV BUSBAR PROTECTION MAIN-2 BAY UNIT PANEL	+BBP2-5

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MANUFACTURER	SCHEMATICS DWG.NO	PANEL DESCRIPITION	PANEL REFERENCE
ABB PROTECTION & SUBSTATION AUTOMATION		SS 8833 13.8KV RELAY PANELS	
	CD-290053	13.8KV Capacitor Bank-1 Protection Panel	+CBP-1
	CD-290055	13.8KV Capacitor Bank-2 Protection Panel	+CBP-2
	CD-290057	13.8KV Capacitor Bank-2 Protection Panel	+CBP-3
	CD-290060	13.8 KV ACCS PANEL	+ACCS
	CD-290063	13.8KV ACSE PANEL	+ACSE
	CD-290071	SCMS Interface Panel	+SCMS
	CD-290069	13.8KV Under Voltage Load Shedding Panel	+UVLS
	CD-290065	13.8KV Under Frequency Load Shedding Panel-1	+UFLS01
	CD-290067	13.8KV Under Frequency Load Shedding Panel-2	+UFLS02

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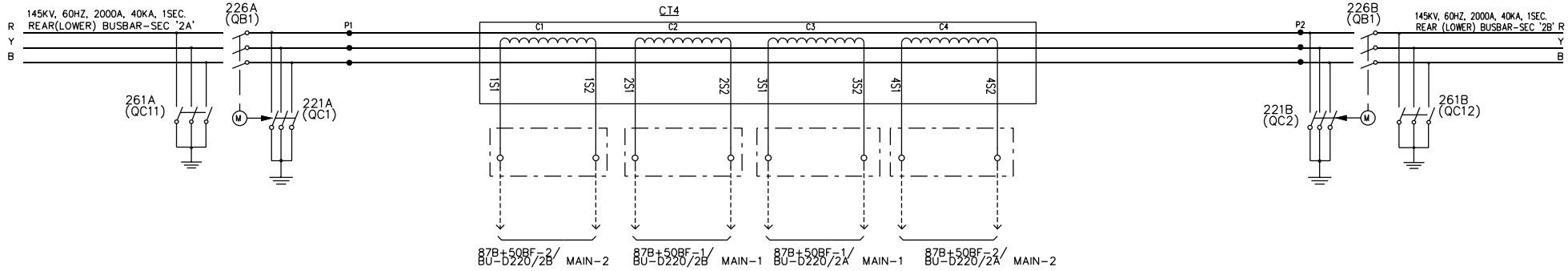

LOCATION OF GIS CT	CT	RATIO	CLASS	VK IN VOLT	Image IN mA @ VK	RCT IN OHMS	BURDEN IN VA	BURDEN IN VA
BUS 2A/2B	CT4 CORE-1	2000/1A	X	>600 at 2000/1A TAP	< = 25	<5	--	87B+50BF-2/BU-D220/2B MAIN-2
	CT4 CORE-2	2000/1A	X	>600 at 2000/1A TAP	< = 25	<5	--	87B+50BF-1/BU-D220/2B MAIN-1
	CT4 CORE-3	2000/1A	X	>600 at 2000/1A TAP	< = 25	<5	--	87B+50BF-1/BU-D220/2A MAIN-1
	CT4 CORE-4	2000/1A	X	>600 at 2000/1A TAP	< = 25	<5	--	87B+50BF-2/BU-D220/2A MAIN-2

AS-BUILT BY _____ DATE _____ | CONTRACT NO. 11131113/00 | JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 14	FOR APPROVAL

DRAWN BY RIZ CHECKED BY KVR
DATE STARTED 11.04.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

PRIMARY SYSTEM D220
132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-6
S/S 8709 S-13656
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
نقل الكهرباء
National Grid SA

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NG/D2-D (2012/01)
DMS VECTOR NGD200

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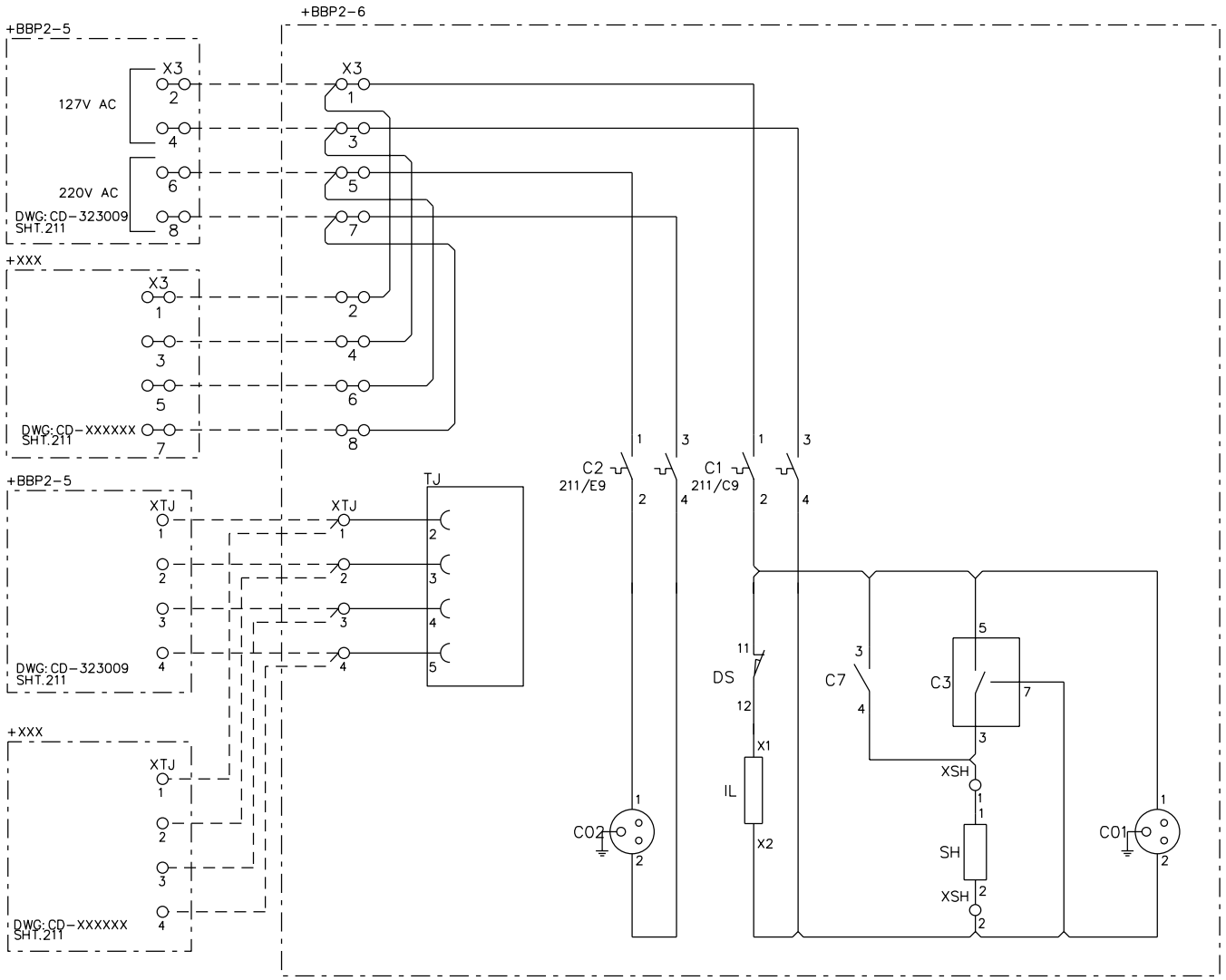

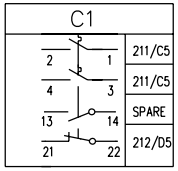

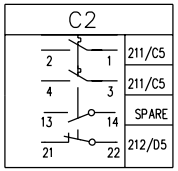

AS-BUILT BY _____ DATE _____ | CONTRACT NO. 11131113/00 | JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 14	FOR APPROVAL

DRAWN BY RIZ CHECKED BY KVR
DATE STARTED 11.04.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

AC SUPPLY FOR ILLUMINATION &POWER SOCKET
132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-6
S/S 8709 S-13656
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
نقل الكهرباء
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DMS VECTOR NGD200

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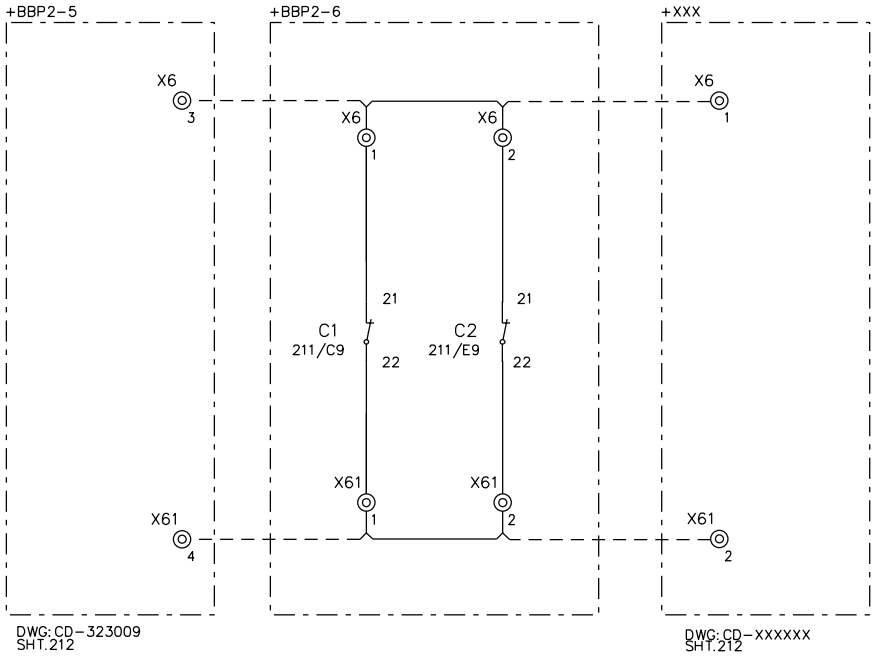

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656	CUB.LIGHTING,HEATER&SOKET ALARM CKT.	الشركة الوطنية لنقل الكهرباء / نقل الكهرباء National Grid SA
			132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-6	
01 / 13 49 / FACTORY ASBUILT	DRAWN BY RIZ	CHECKED BY KVR	S/S 8709 S-13656	INDEX - / PLANT NO. C421 / DRAWING NUMBER CD-323016 / SHEET NO. SHT 212 CONT. 216 / REV. NO. 01
00 / 13 14 / FOR APPROVAL	DATE STARTED 11.04.2013	DATE COMPLETED _____	RIYADH SAUDI ARABIA	
REV. NO. / DATE / DESCRIPTION	OPRG. DEPT. CTPD	ENG. DEPT. AUT-PSAC		

NG/D2-D (2012/01)

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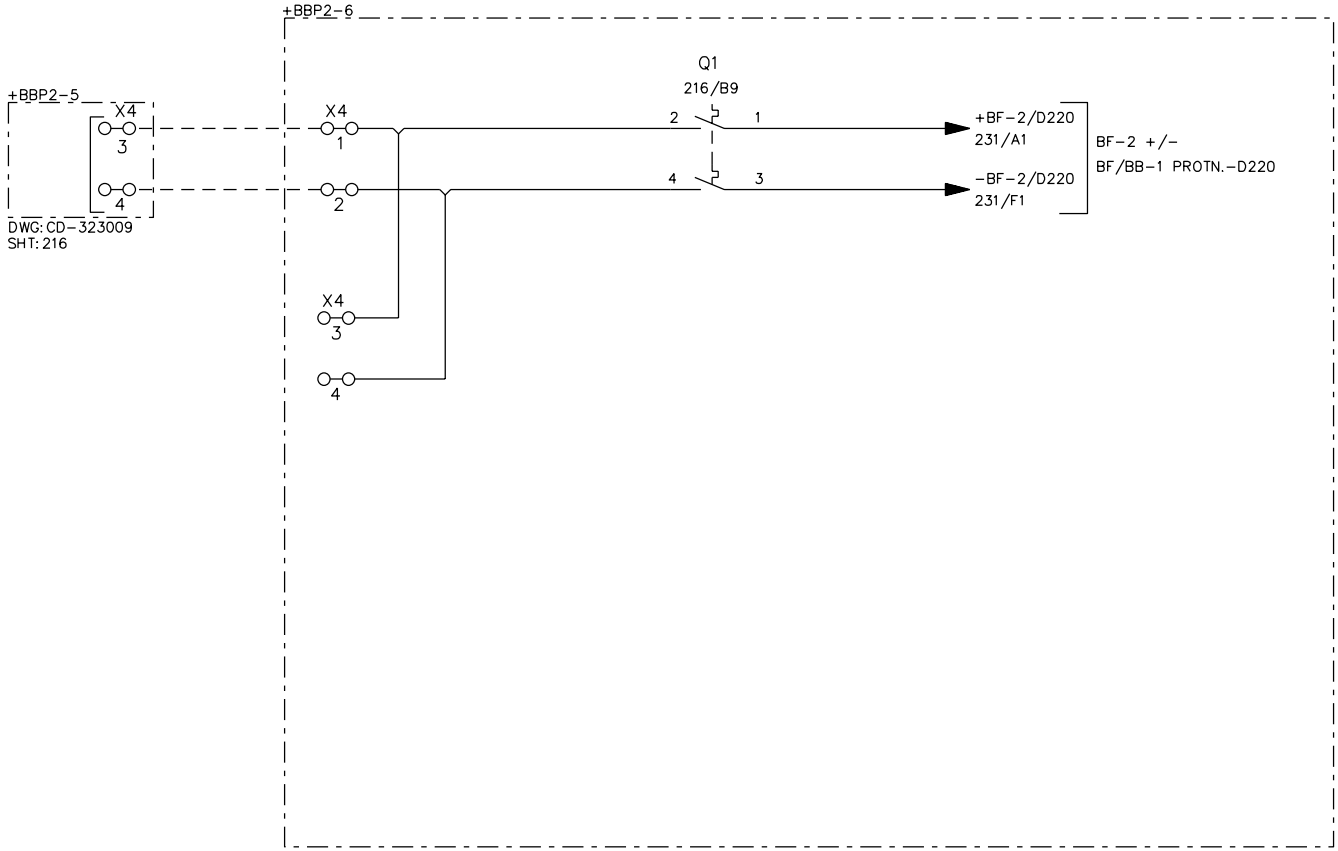

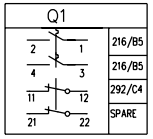

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 14	FOR APPROVAL

DRAWN BY RIZ CHECKED BY KVR
DATE STARTED 11.04.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

DC SUPPLY DISTRIBUTION
132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-6
S/S 8709 S-13656
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
نقل الكهرباء
National Grid SA

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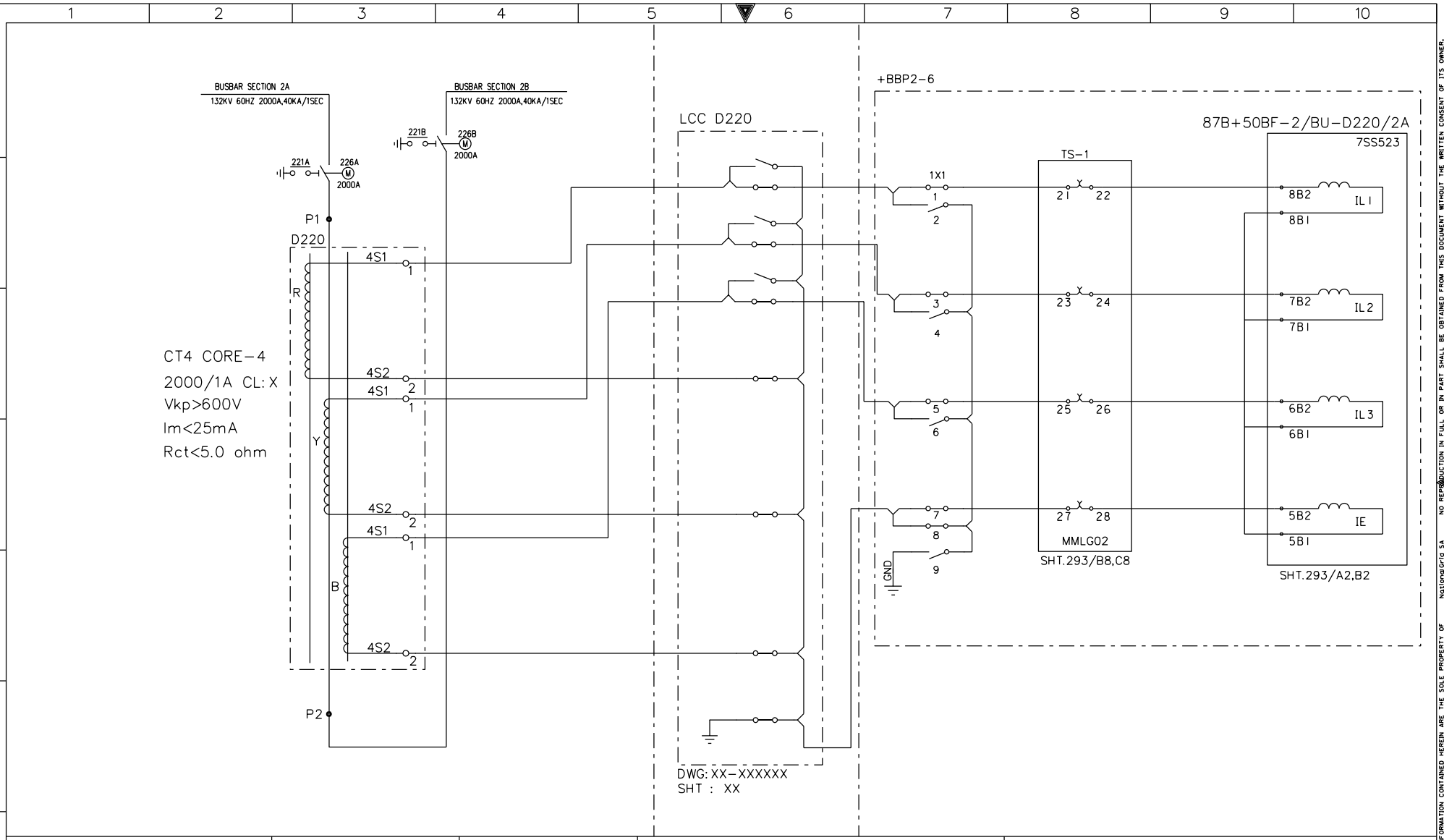

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 14	FOR APPROVAL

DRAWN BY RIZ CHECKED BY KVR
DATE STARTED 11.04.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

CURRENT TRANSFORMER INPUTS -87B+50BF-2/BU-D220/2A
132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-6
S/S 8709 S-13656
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
نقل الكهرباء
National Grid SA

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NG/D2-D (2012/01)
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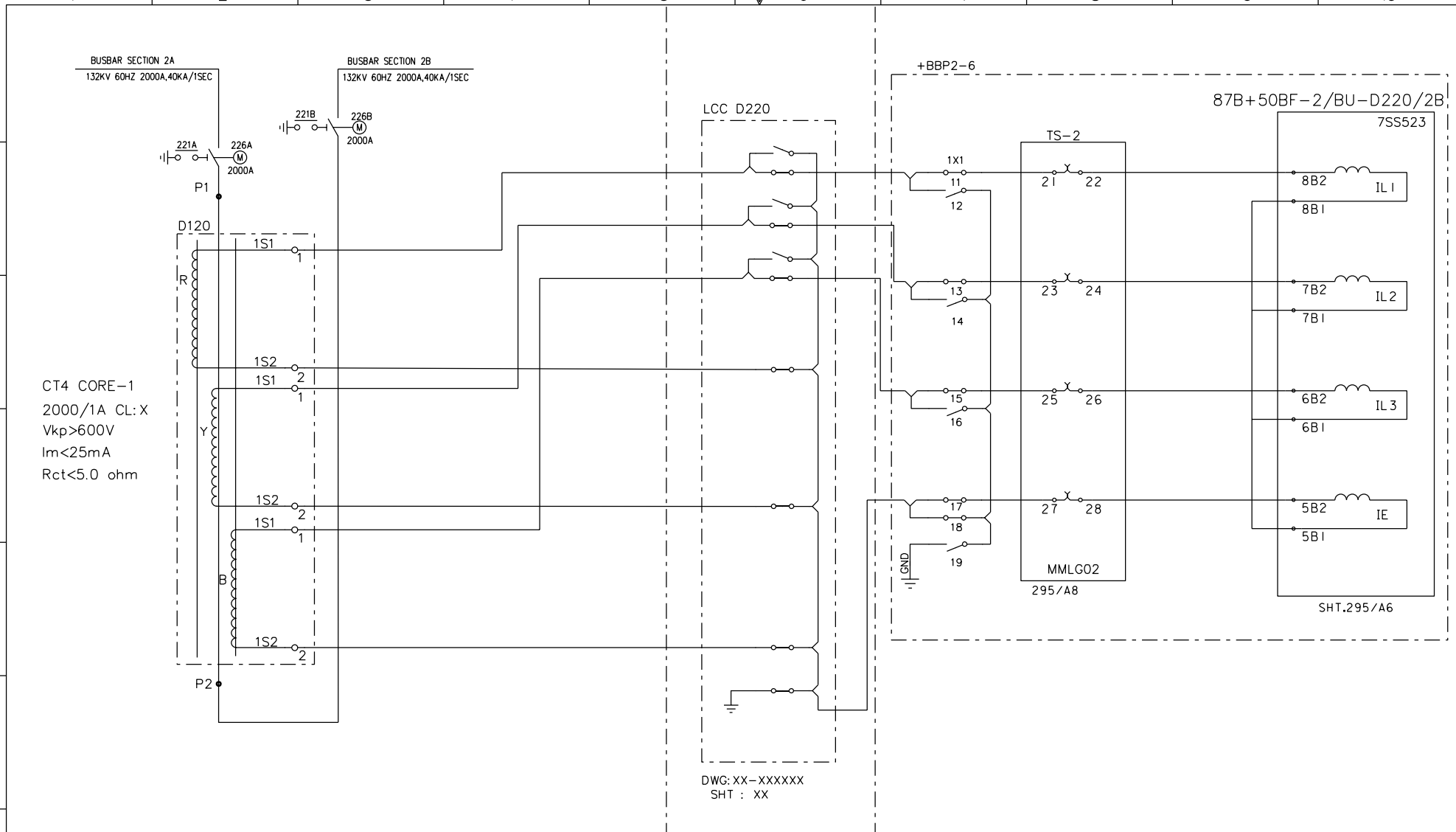

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 14	FOR APPROVAL

DRAWN BY RIZ CHECKED BY KVR
DATE STARTED 11.04.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

CURRENT TRANSFORMER INPUTS -87B+50BF-2/BU-D220/2B
132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-6
S/S 8709 S-13656
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
نقل الكهرباء
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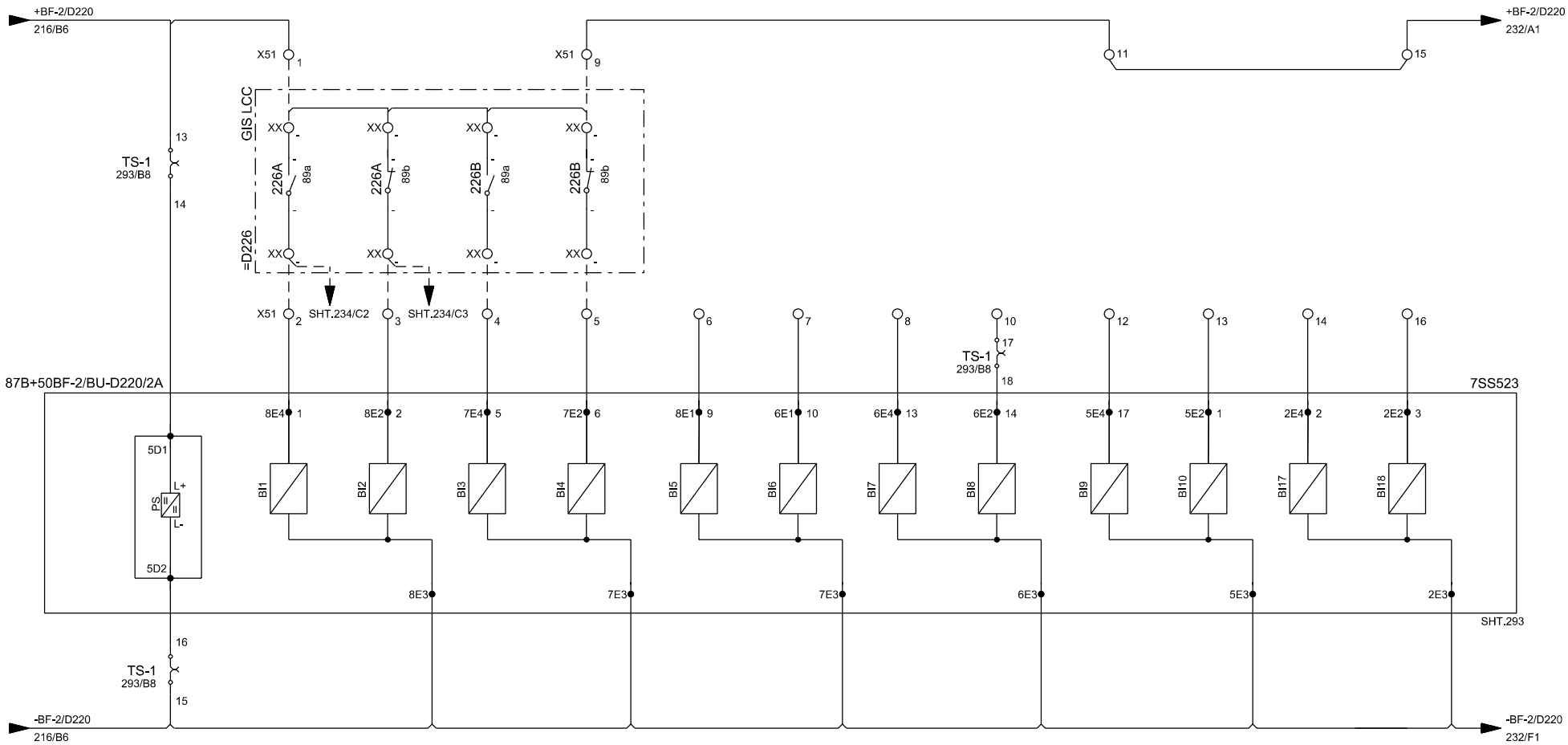
POWER SUPPLY	ISOLATOR STATUS DS-D226A CLOSE	DS-D226A OPEN	DS-D226B CLOSE	DS-D226B OPEN	SPARE



AS-BUILT BY _____ DATE _____ | CONTRACT NO. 11131113/00 | JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 14	FOR APPROVAL

DRAWN BY RIZ CHECKED BY KVR
DATE STARTED 11.04.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

87B+50BF-2/BU-D220/2A PROTN. RELAY - BINARY INPUTS
132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-6
S/S 8709 S-13656
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
نقل الكهرباء National Grid SA

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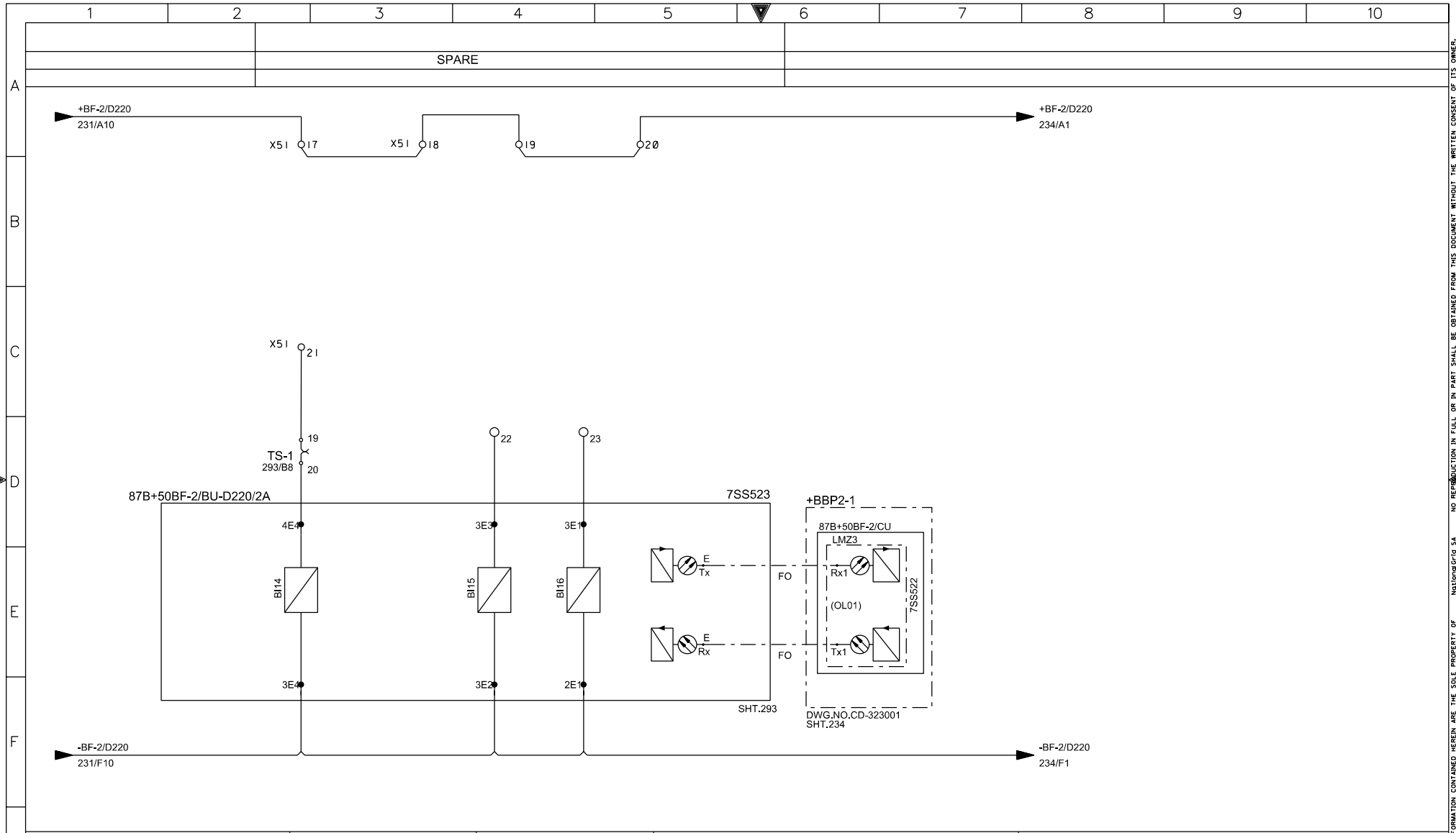

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 14	FOR APPROVAL

DRAWN BY RIZ CHECKED BY KVR
DATE STARTED 11.04.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

87B+50BF-2/BU-D220/2A PROTN. RELAY - BINARY INPUTS
132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-6
S/S 8709 S-13656
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
نقل الكهرباء
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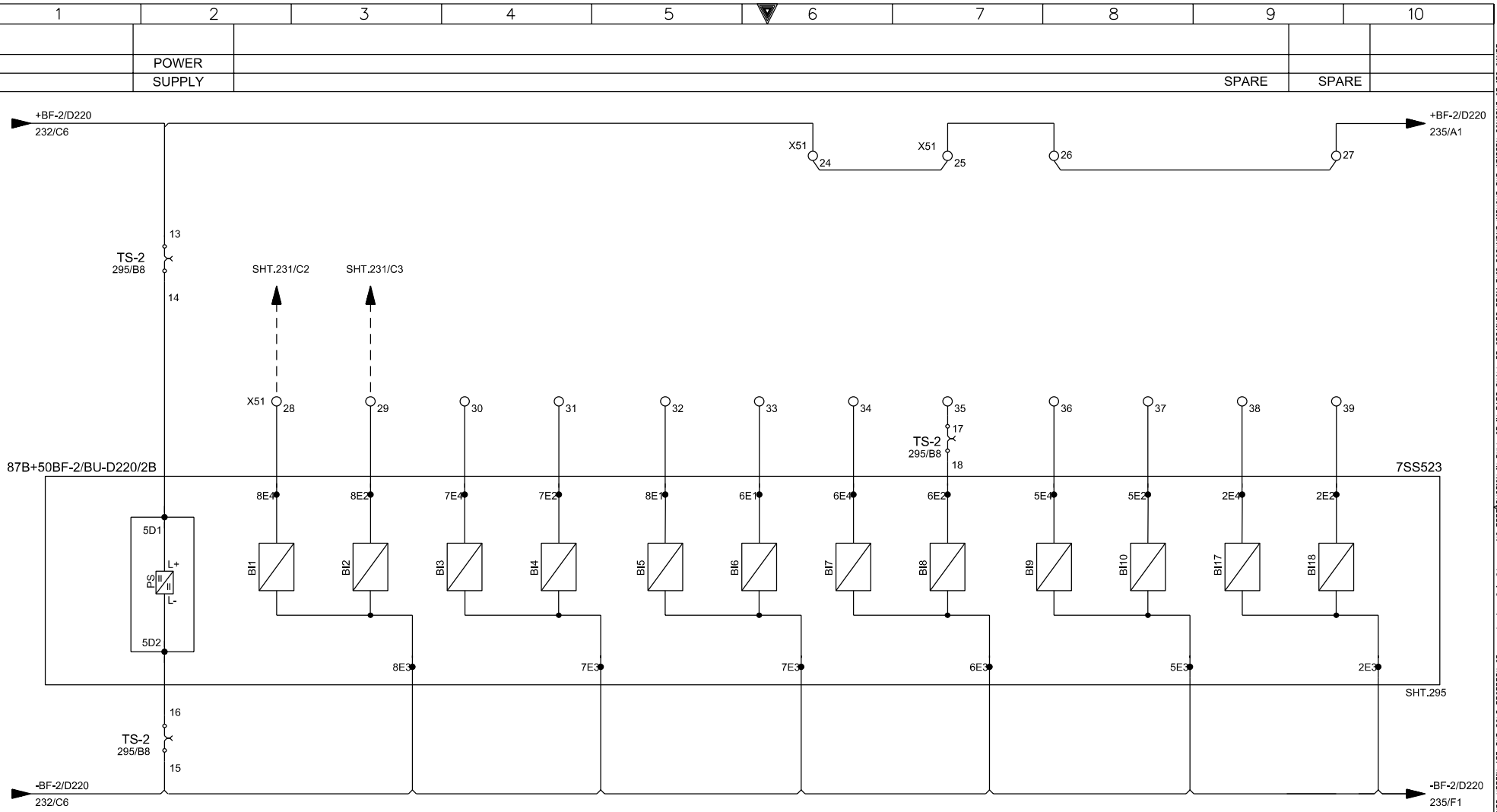

AS-BUILT BY _____ DATE _____

CONTRACT NO. 11131113/00

JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 14	FOR APPROVAL

DRAWN BY RIZ CHECKED BY KVR

DATE STARTED 11.04.2013 DATE COMPLETED _____

OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

87B+50BF-2/BU-D220/2B PROTN. RELAY - BINARY INPUTS

132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-6

S/S 8709 S-13656

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء

نقل الكهرباء National Grid SA

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NG/D2-D (2012/01)

DMS VECTOR NGD200

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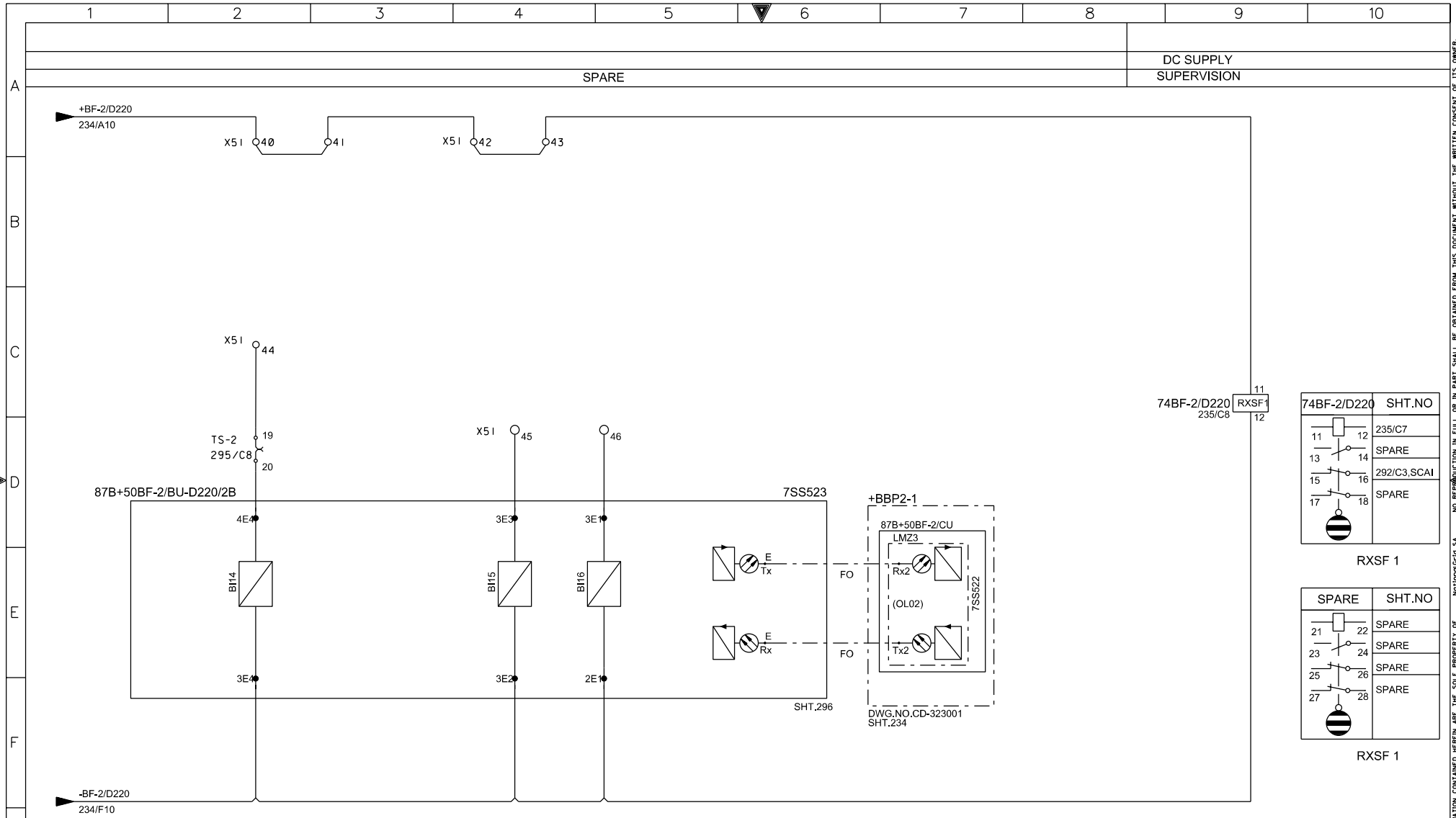

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 14	FOR APPROVAL

DRAWN BY RIZ CHECKED BY KVR
DATE STARTED 11.04.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

87B+50BF-2/BU-D220/2B PROTN. RELAY - BINARY INPUTS
132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-6
S/S 8709 S-13656
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
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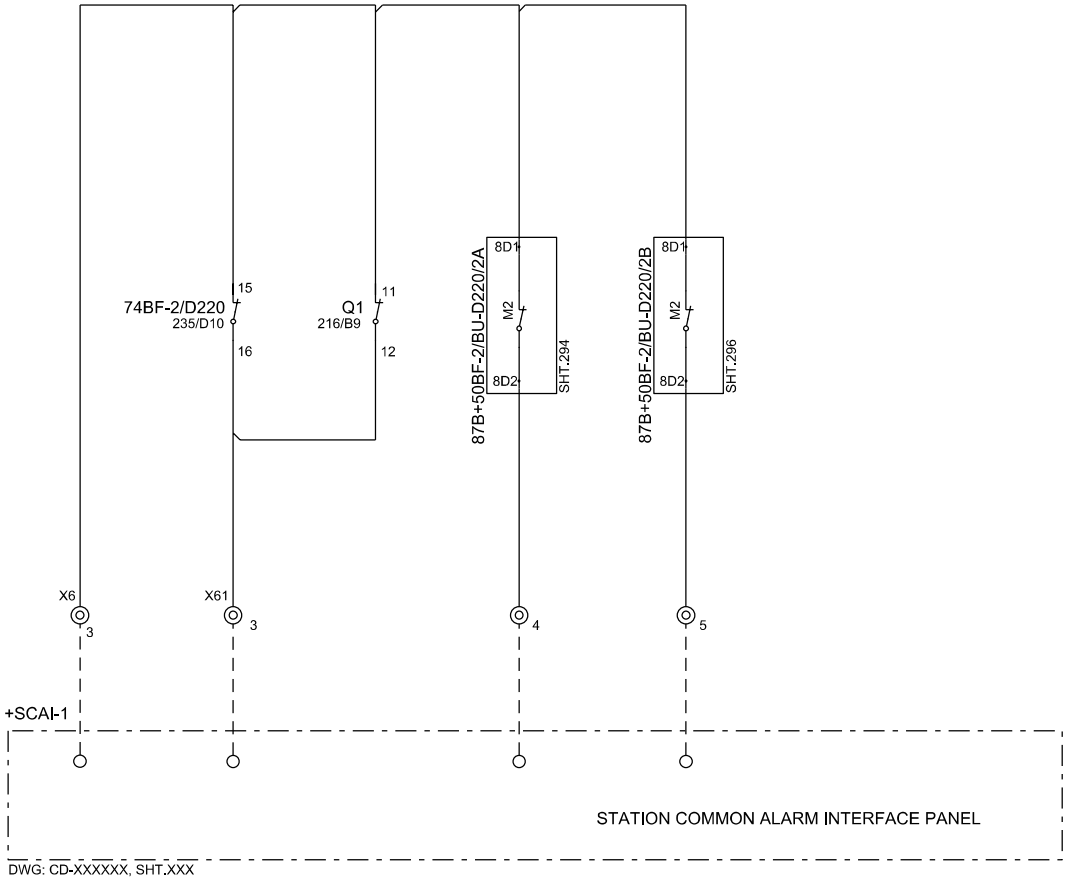
DC SUPPLY FAULTY	87B+50BF-2/BU-D220/2A RELAY FAULTY	87B+50BF-2/BU-D220/2B RELAY FAULTY



AS-BUILT BY _____ DATE _____ | CONTRACT NO. 11131113/00 | JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 14	FOR APPROVAL

DRAWN BY RIZ CHECKED BY KVR
DATE STARTED 11.04.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

COMMON ALARM CIRCUITS
132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-6
S/S 8709 S-13656
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
نقل الكهرباء National Grid SA

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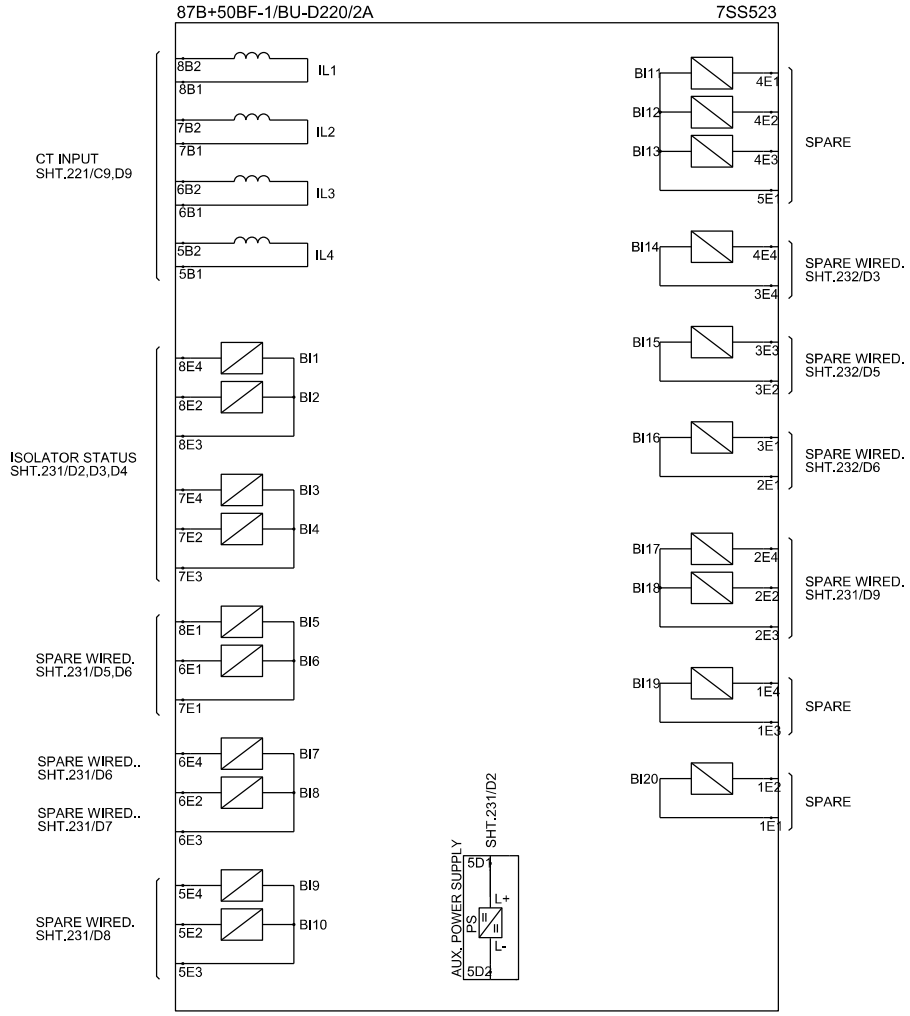

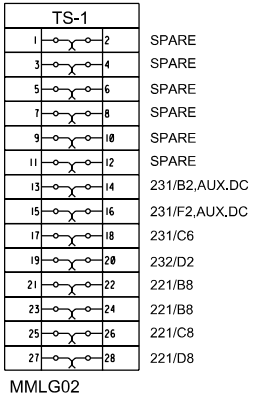

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 14	FOR APPROVAL

DRAWN BY RIZ CHECKED BY KVR
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OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

87B+50BF-2/BU-D220/2A INTERNAL DIAGRAM
132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-6
S/S 8709 S-13656
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
نقل الكهرباء National Grid SA

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DMS VECTOR NGD200

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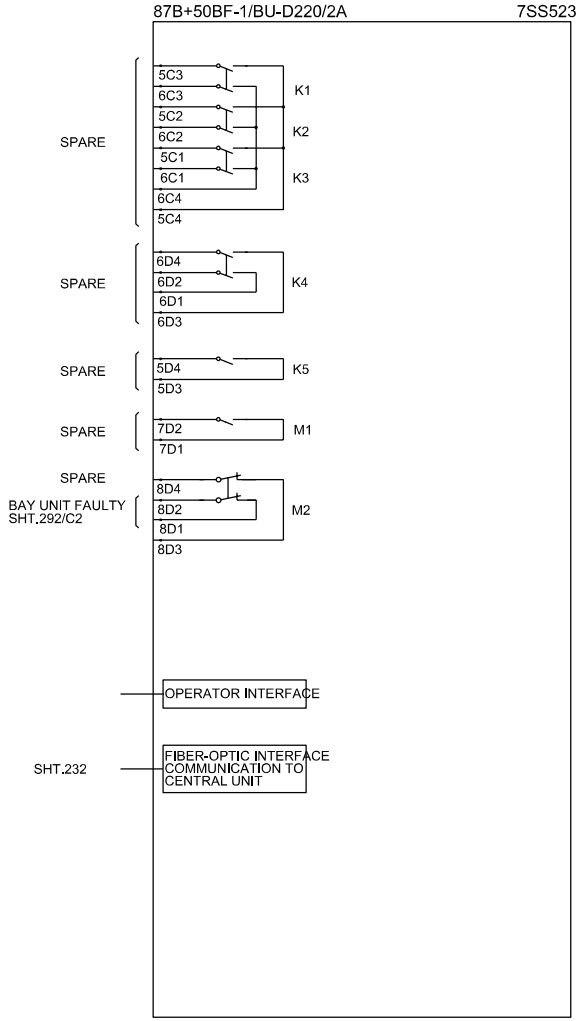

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 14	FOR APPROVAL

AS-BUILT BY _____ DATE _____

CONTRACT NO. 11131113/00

JOB ORDER NO. S-13656

DRAWN BY RIZ CHECKED BY KVR

DATE STARTED 11.04.2013 DATE COMPLETED _____

OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

87B+50BF-2/BU-D220/2A INTERNAL DIAGRAM

132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-6

S/S 8709 S-13656

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء

نقل الكهرباء National Grid SA

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NG/D2-D (2012/01)

DMS VECTOR NGD200

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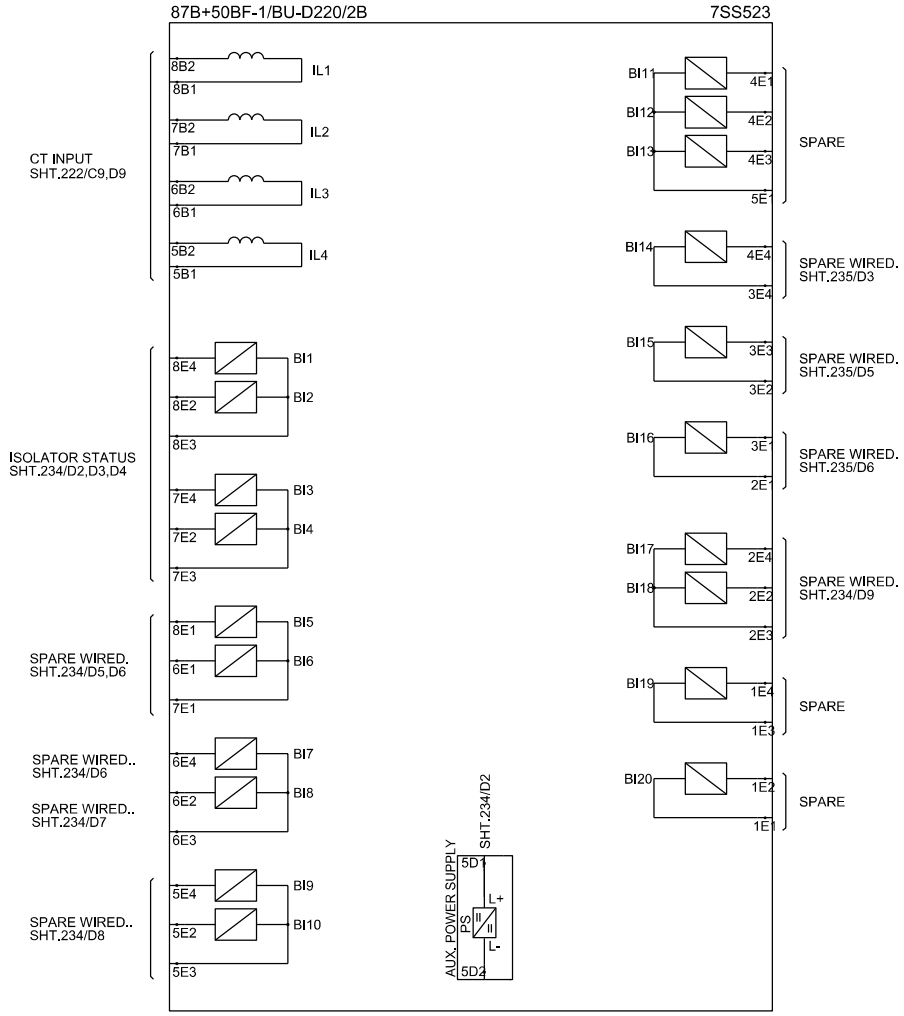

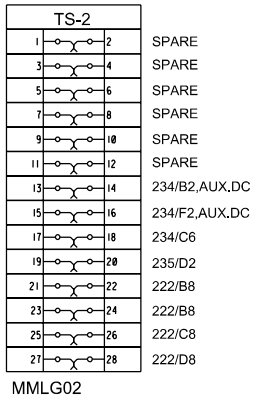

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656	87B+50BF-2/BU-D220/2B INTERNAL DIAGRAM	الشركة الوطنية لنقل الكهرباء	نقل الكهرباء National Grid SA
			132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-6		
01 / 13 49 / FACTORY ASBUILT	DRAWN BY RIZ	CHECKED BY KVR	S/S 8709 S-13656	INDEX / PLANT NO. / DRAWING NUMBER	SHEET NO. SHT CONT. / REV. NO.
00 / 13 14 / FOR APPROVAL	DATE STARTED 11.04.2013	DATE COMPLETED _____	RIYADH SAUDI ARABIA	- / C421 / CD-323016	295 296 / 01
REV. NO. / DATE / DESCRIPTION	OPRG. DEPT. CTPD	ENG. DEPT. AUT-PSAC			

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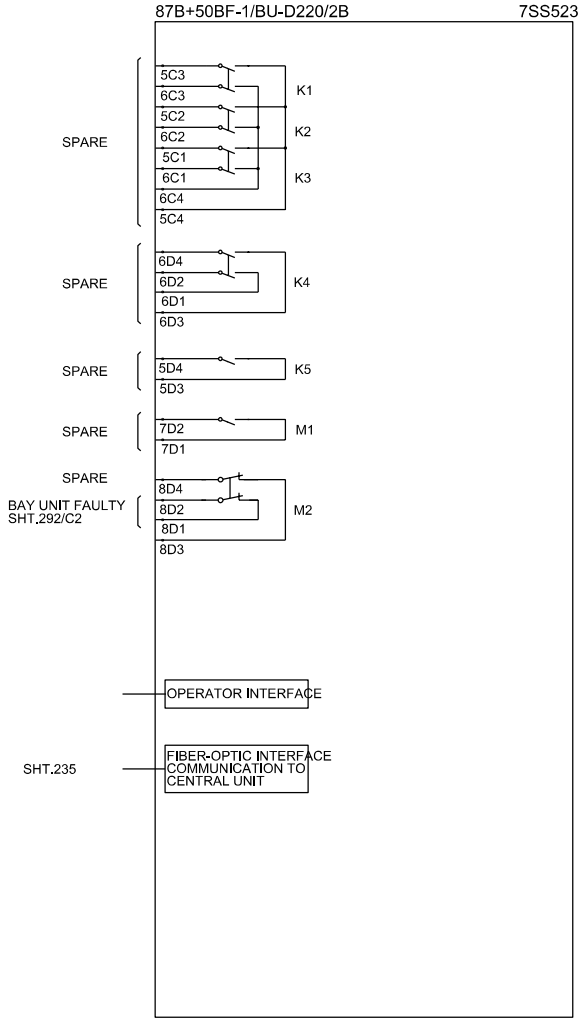
DMS VECTOR NGD200



REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 14	FOR APPROVAL

AS-BUILT BY _____ DATE _____

CONTRACT NO. 11131113/00

JOB ORDER NO. S-13656

DRAWN BY RIZ CHECKED BY KVR

DATE STARTED 11.04.2013 DATE COMPLETED _____

OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

87B+50BF-2/BU-D220/2B INTERNAL DIAGRAM

132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-6

S/S 8709 S-13656

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء

نقل الكهرباء National Grid SA

INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
-	C421	CD-323016	296	301	01

NG/D2-D (2012/01)

DMS VECTOR NGD200

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REFERENCE	X1 CT CKT.
221/B7	1
221/B7	2
221/C7	3
221/C7	4
221/C7	5
221/C7	6
221/C7	7
221/D7	8
221/D7	9
SPARE	10
222/B7	11
222/B7	12
222/C7	13
222/C7	14
222/C7	15
222/C7	16
222/C7	17
222/D7	18
222/D7	19
SPARE	20

REFERENCE	X51 CON & PROTN CKTS.
231/A3	1
231/C2	2
231/C3	3
231/C4	4
231/C4	5
231/C5	6
231/C5	7
231/C6	8
231/A4	9
231/C7	10
231/C8	11
231/C8	12
231/C8	13
231/C8	14
231/A10	15
231/C10	16
232/A2	17
232/A3	18
232/A4	19
232/A5	20
232/C2	21
232/C4	22
232/C4	23
234/A6	24
234/A7	25
234/A8	26
234/A9	27
234/C2	28
234/C3	29
234/C4	30
234/C4	31
234/C5	32
234/C6	33
234/C6	34
234/C7	35
234/C8	36
234/C8	37
234/C9	38
234/C9	39
235/A2	40

REFERENCE	X51 CON & PROTN CKTS.
235/A3	41
235/A4	42
235/A4	43
235/C2	44
235/C4	45
235/C4	46
SPARE	47
SPARE	48
SPARE	49
SPARE	50
SPARE	51
SPARE	52
SPARE	53
SPARE	54
SPARE	55
SPARE	56
SPARE	57
SPARE	58
SPARE	59
SPARE	60

REFERENCE	X61 ALM. CKT.
212/E5	1
212/E5	2
292/E4	3
292/E5	4
292/E7	5
SPARE	6
SPARE	7
SPARE	8
SPARE	9
SPARE	10
SPARE	11
SPARE	12
SPARE	13
SPARE	14
SPARE	15

REFERENCE	X4 DC CKTS.
216/B3	1
216/B3	2
216/D3	3
216/D3	4
SPARE	5
SPARE	6
SPARE	7
SPARE	8
SPARE	9
SPARE	10

REFERENCE	X3 AC CKT.
211/A3	1
211/A7	2
211/A3	3
211/A7	4
211/B3	5
211/B7	6
211/B3	7
211/B7	8
SPARE	9
SPARE	10

REFERENCE	XTJ T.JACK
211/C3	1
211/D3	2
211/D3	3
211/D3	4
SPARE	5

REFERENCE	XSH SPACE HEATER
211/E6	1
211/F6	2
SPARE	3

REFERENCE	X6 ALM. CKT.
212/C5	1
212/C5	2
292/E3	3
SPARE	4
SPARE	5

AS-BUILT BY _____ DATE _____ | CONTRACT NO. 11131113/00 | JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 14	FOR APPROVAL

DRAWN BY RIZ CHECKED BY KVR
DATE STARTED 11.04.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

TERMINAL BLOCKS +BB2-6
132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-6
S/S 8709 S-13656
RIYADH SAUDI ARABIA

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INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
-	C421	CD-323016	301	NIL	01

NG/D2-D (2012/01)
DMS VECTOR NGD200

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